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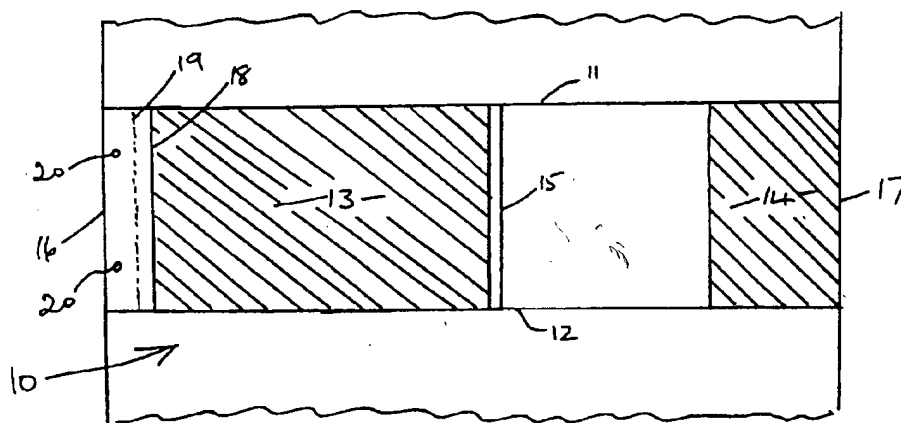
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**GB 0832076 A GB 0715366 A US 3686823 A**

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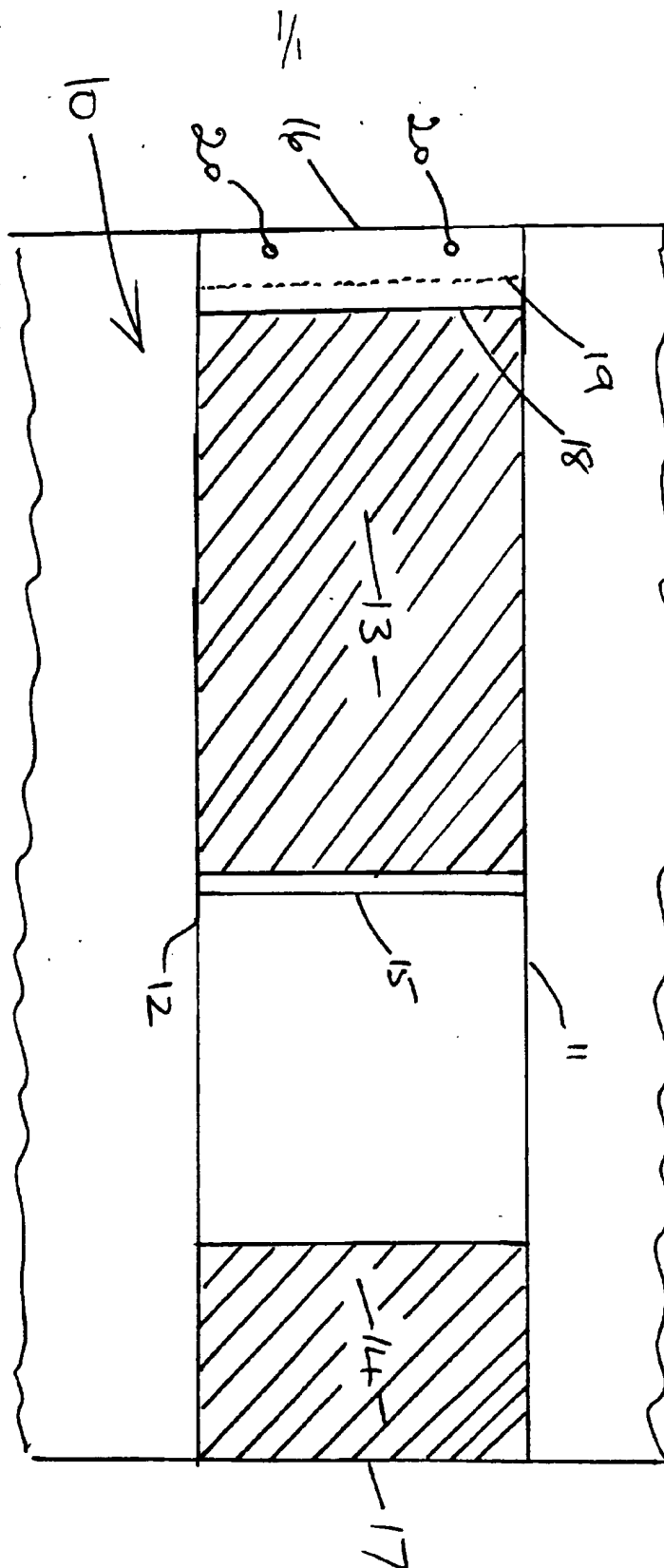
(54) Abstract Title  
**Packaging foodstuffs and bag production**

(57) A method of packaging foodstuffs, such as a loaf of bread, comprises the steps of placing the item of foodstuff in a bag made of shrink-wrap material and applying suction to the bag before closing it so that the bag contacts the surface of the item. The covered item is then heated at a sufficient temperature and for a sufficient time to kill any spores or bacteria which may be on the surface of the item. Such conditions may be a temperature of 105°C for less than 2 minutes. The shrink-wrapped product is then placed in an outer packaging formed by providing thermoplastic material 10, forming perforations on certain areas of the material, 13, 14, folding the material and sealing the edges to form a bag.



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**PACKAGING OF FOODSTUFFS AND BAG PRODUCTION****Field of the Invention**

This invention relates to the packaging of foodstuffs and to a method of bag production and one aspect of the invention is concerned, in particular, with a method of making bags for use in the packaging of bread.

The packaging of foodstuffs should be hygienic and numerous methods have been developed for the improvement of food packaging and, in particular, for ensuring that foodstuffs should have a long shelf-life. There are, for examples, methods of packaging using a modified atmosphere, e.g. nitrogen, which seek to extend the shelf-life of baked products.

Methods involving shrink-wrapping are also employed in, for example, the packaging of cucumbers.

The improvement in shelf-life which is obtained in respect of these various proposals is, however, limited and it is accordingly an object of the primary aspect of the present invention to provide an improved method of packaging an item of foodstuff which enables a longer shelf-life to be obtained than has heretofore been possible.

It is generally accepted that bags in which freshly baked bread is packaged should be such that air can enter the bag in

order to ensure that the bread does not become mouldy. There is also a requirement that the escape of moisture from the bag should be restricted in order to avoid the bread becoming hard and dry.

Further objects of the present invention are thus the provision of methods of making bags for sliced or unsliced, freshly baked bread which are such as to meet these two apparently conflicting requirements.

### Summary of the Invention

According to a first aspect of the present invention there is provided a method of packaging an item of foodstuff, which method comprises placing the item within a bag formed of shrink-wrap material, applying suction to the bag and closing the bag so that the material of the bag contacts the surface of the item in heat-conducting relationship therewith and applying heat such that the surface of the item is raised to a temperature in excess of 100° C. for such length of time that any spores or bacteria on the surface of the item will be killed.

The temperature to which the surface of the item is raised is preferably in excess of 102° C., for example, 105° C., and is maintained at this temperature only for a short length of time, i.e. only a matter of seconds or for one or two minutes at most, depending on the nature of the item of foodstuff.

Heating of the item contained within the bag of shrink-wrap material may be effected by, for example, dipping the bagged item into a bath of boiling salted water, either by a batch process or using a conveyor to obtain passage of the bagged item through the bath of boiling salted water. The concentration of salt in the boiling salted water will be so chosen as to ensure that the temperature of the bath is sufficient to raise the temperature of the surface of the item to that required to kill any spores or bacteria on the surface of the item.

Other methods of heating to the required temperature may be employed. For example, the bagged items may be conveyed through a heating chamber which contains heating elements, such as radiant heating elements (or through which hot air is blown).

The item of foodstuff to be packaged may be a fruit or a vegetable. In which case, the packaged fruit or vegetable will have a longer shelf-life than other fruit or vegetables. The item of foodstuff may alternatively be a sandwich. It will thus be seen that the invention provides a means whereby sandwiches may be produced in a "clean" area, so that the spore and bacteria contamination of the bread is minimised, and then transported to the customers in a form of packaging which extends the shelf-life of the sandwiches. For sandwich vendors in city centres or other high-cost areas, the need for making the sandwiches on or very close to the point of sale can thus be eliminated, with consequent cost-savings. By a "clean" area is meant an area in which the air is

purified by means of filters or the like to remove any spores or bacteria from the air.

If the item of foodstuff is a baked product, for example, a loaf of bread, a cake, pie, pasty or bun, the baked product will preferably be placed within the bag of shrink-wrap material immediately after being taken out of the oven. The length of time for which heat has to be applied to ensure that all the spores and bacteria have been killed will depend on the temperature of the baked product when it is placed within the bag. Thus, by placing the baked product within the bag immediately after the baked product has been taken out of the oven, the time required for heating is kept to a minimum.

After the sealed, bagged product has been heated, it is preferably placed within an outer wrapping in the form of a bag, produced by the method defined below. The present invention can thus eliminate the need for bakers to work anti-social hours, in that it enables "fresh" bread to be sold in a supermarket or other shop even if it has been baked several days previously. The invention also enables specialist bread makers to extend their customer areas and even permits bread to be baked in one country and exported to another country.

According to a second aspect of the present invention there is provided a method of making a bag comprising two layers disposed one on top of the other, which method includes:-

- a) providing a sheet of flexible thermoplastic material,
- b) applying printing to the sheet,

- c) forming arrays of perforations in the sheet so that all, or substantially all, of what will be the lower of the two layers is covered by the perforations and so that a part or parts only of what will be the upper of the two layers is or are covered by the perforations, the remainder of what will be the upper of the two layers being imperforate,
- d) folding the sheet so that the two layers are disposed one on top of the other, and
- e) joining opposed edges of the two layers together to form the bag.

The sheet of flexible material from which the bag is formed preferably forms part of a roll of such material, which is subjected to a series of operations to form a plurality of bags which are stacked one on top of another. Each bag is preferably formed integrally with a mounting strip by which the bag can be mounted on a wicket, the bag being separated from its associated mounting strip by a tear line so that, when the stack of bags is mounted on a wicket, the bags can be torn one by one from the stack.

The perforations are preferably formed by flame-cutting and are preferably disposed in closely-spaced parallel rows, with the perforations of circular form in plan view and with the perforations in one row offset from those in the adjacent rows to increase the degree of close packing that can be obtained.

According to a third aspect of the present invention there is provided a method of making a bag comprising two layers disposed one on top of the other, which method includes:-

- a) providing a rolled sheet of flexible thermoplastic material,
- b) applying printing to the sheet,
- c) forming arrays of perforations in selected areas of the sheet so that there are at least two areas which are perforated and at least one area which is not perforated,
- d) folding the sheet so that the two layers are disposed one on top of the other, and
- e) joining opposed edges of the two layers together to form the bag.

The method of folding is preferably such that the layer which will be the lower of the two layers is slightly larger than the layer which will be the upper of the two layers, said additional portion of the lower layer including a mounting strip, as referred to above.

The bag made by the methods according to the second and third aspects of the invention is preferably used as the outer wrap for the packaged item of foodstuff produced in accordance with the first aspect of the invention.

If the packaged item is a loaf of bread, the outer wrap will be opened by the customer, who will then remove the shrink-material. The loaf of bread will then be stored, for the day or two while it is being eaten, in the outer wrap. Before removing the loaf of bread from the shrink-wrap material, the customer will preferably place the



loaf of bread in a microwave oven for a short length of time, for example, for up to half a minute, to restore the loaf to the condition it was in when first placed within the shrink-wrap material. Alternatively, the loaf of bread can be removed from the shrink-wrap material and then placed in an oven for an appropriate length of time dependent on the temperature of the oven, again to restore the loaf to its freshly-baked condition.

According to a fourth aspect of the invention there is provided a method of packaging a loaf of bread in which, after the loaf of bread has been baked and withdrawn from the oven, and before the loaf of bread has cooled to a temperature significantly below 100° C., the loaf of bread is wrapped using a shrink-wrap material in such manner as to exclude any significant volume of air from the wrap.

As an alternative to the use of pre-formed bags made by the methods defined above, the loaves of bread may be wrapped using a flow-wrapping system, i.e. a roll of plastics material is employed which has a central portion which is imperforate and edge portions which each extend for about a quarter of the width of the roll. The edges of the roll are bonded together beneath the loaves of bread as they are passed along a conveyor system so that the portion of the wrapping beneath each loaf is perforated with the remainder of the wrapping imperforate.

Such flow-wrapping system may be located immediately after the means for effecting shrink-wrapping of the loaves of bread (or other food items).

### **Brief Description of the Drawing**

The single figure of the accompanying drawing shows a section of a sheet of polypropylene film, which section is used to produce a bag for a pre-packed loaf of bread.

### **Description of the Preferred Embodiment**

The single figure of the accompanying drawing shows the section of a roll of polypropylene film which, at the appropriate stage of the manufacturing process, is cut from the roll and is folded and welded to form a bag for a pre-packed loaf of bread.

The roll of polypropylene film is first subjected to a printing process in which a repeated pattern is applied to the film, the pattern including all the information, including illustrations, instructions and a bar code, which is required for an individual bag. The film is supplied in roll form and, during printing, is transferred from one roll to another so as to obtain a roll of film to which the necessary printing has been applied, the printing being in the form of a repeated pattern. In the drawing, the sheet of film is illustrated at 10 and the repeated pattern is between the lines 11 and 12.

After printing, the sheet is perforated by means of flame cutting equipment to form two areas of perforations, these being represented by the shaded areas 13 and 14 in the drawing. As will be seen, area 13 is larger than area 14 and extends over almost the whole of what will be the lower layer of the bag, i.e. the loaf of bread will be placed in the bag in such manner that the bottom of the loaf will rest on the perforated area 13.

During the flame-cutting process, the sheet of film will be transferred from one roll to another. The nature of the process is such that a very thin rim is formed around each aperture produced by flame-cutting and this rim will be of marginally greater thickness than the remainder of the sheet, i.e. the perforated areas will have a greater thickness than the unperforated areas. As, however, the perforated sheet is wound on to the receiving roll, there will be two spaced areas of increased thickness and this will enable an even rolling procedure to be carried out without wrinkling or puckering or other distortion of the sheet.

After printing and perforation, the roll of printed and perforated film will be subjected to further treatments, i.e. the roll will be folded in two along the line 15 and the sections will be separated from one another while, simultaneously, the edges of the sections will be welded together to form the bags.

As shown, each section is bounded by the lines 11 and 12 and has ends 16 and 17. When the sheet is folded in half, this will be about the line 15 and will result in end 17 being superimposed

on a line 18 forming a boundary of the area 13. The lower layer of the bag formed by the folding, cutting and welding procedure will thus have a slightly greater area than the upper layer of the bag. It is also to be noted that the proportion of the upper layer which is perforated, i.e. the area 14, is substantially less than half the total area of said upper layer.

The extra portion of the lower layer, i.e. the part of the sheet between the end 16 and the line 18, is formed with a tear line 19. The strip of film between the tear line 19 and the end 16 serves as a mounting strip which is formed with a pair of spaced holes 20 (as shown) so that the mounting strips of the bags can be used, as known per se, for mounting a stack of bags on a wicket from which the bags are torn as pre-packed loaves of bread are placed in the bags.

The provision of apertures in the base of the bag ensures that air can enter the bag so as to avoid the forming of mould within the bag. The forming of the top of the bag so that the major proportion thereof is unperforated ensures that the escape of moisture from the bag is limited. The bread thus does not dry out and stays "fresh" for substantially longer than is the case with the bread bags currently available.

It is to be appreciated that, although the method of making bags described above has been developed in relation to bags for pre-packaged loaves of bread, the method can also be used for making bags for buns, muffins, baps and the like.

Pre-packaging of the loaves of bread is effected by placing the loaves of bread, immediately after they have been withdrawn from the oven, within bags of shrink-wrap material. Suction is applied to withdraw any air from the bags which are then sealed. The wrapped loaves of bread are then subjected to a heat-treatment operation to ensure that any spores or bacteria on the surface of the loaf of bread are killed.

The heat-treatment operation is such as to ensure that the surface of the loaf of bread in contact with the shrink-wrap material is heated to a temperature, typically within the range of from 102° C. to 105° C. which is sufficient to kill any spores or bacteria. The heat-treatment operation may be effected by dipping the wrapped loaves of bread in a bath of boiling salted water, either by a batch process or by means of a conveyor system, such that the wrapping material is exposed to the temperature of the bath for the required length of time. The concentration of the salt in the bath will be such that the boiling point is at the required temperature. Other forms of heating may be employed, as mentioned earlier.

After the wrapped loaves have been heat-treated, they are wrapped in the printed and perforated bags produced as described in detail above.

Although particular reference has been made to the packaging of bread, it is to be appreciated that the invention is applicable to other baked products which can be wrapped

immediately they are removed from the oven. Examples include pies, pasties, buns and the like. Sandwiches and other items of foodstuff, e.g. fruit and vegetables, can also be packed within a shrink-wrap material and the wrapped product then subjected to a heat-treatment operation.

## Claims:-

1. A method of packaging an item of foodstuff, which method comprises placing the item within a bag of shrink-wrap material, applying suction to the bag and closing the bag so that the material of the bag contacts the surface of the item in heat-conducting relationship therewith and applying heat such that the surface of the item is raised to a temperature in excess of 100° C. for such length of time that any spores or bacteria on the surface of the item will be killed.
2. A method as claimed in Claim 1, in which the temperature to which the surface of the item is raised is in excess of 102° C. and is maintained at this temperature only for a short length of time, i.e. only for a matter of seconds or for one or two minutes at most, depending on the nature of the item of foodstuff.
3. A method as claimed in Claim 1, in which the item of foodstuff is a fruit or a vegetable or a sandwich.
4. A method as claimed in Claim 1, in which the item of foodstuff is a baked product which is placed within the bag of shrink-wrap material immediately after being taken out of the oven in which it was baked.
5. A method as claimed in Claim 4, in which the baked product is a loaf of bread.

6. A method as claimed in Claim 5, in which, after the loaf of bread contained within the bag of shrink-wrap material has been heated, it is placed within an outer wrapping.

7. A method as claimed in Claim 6, in which the outer wrapping is in the form of a bag comprising two layers disposed one on top of the other and is produced by a method which includes:-

- a) providing a sheet of flexible thermoplastic material,
- b) applying printing to the sheet,
- c) forming arrays of perforations in the sheet so that all, or substantially all, of what will be the lower of the two layers is covered by the perforations and so that a part or parts only of what will be the upper of the two layers is or are covered by the perforations, the remainder of what will be the upper of the two layers being imperforate,
- d) folding the sheet so that the two layers are disposed one on top of the other, and
- e) joining two opposed edges of the two layers together to form the bag.

8. A method as claimed in Claim 6, in which the outer wrapping is in the form of a bag comprising two layers disposed one on top of the other and is produced by a method which includes:

- a) providing a rolled sheet of flexible thermoplastic material,
- b) applying printing to the sheet,



- c) forming arrays of perforations in selected areas of the sheet so that there are at least two areas which are perforated and at least one area which is not perforated,
- d) folding the sheet so that the two layers are disposed one on top of the other, and
- e) joining opposed edges of the two layers together to form a bag.

9. A method of packaging an item of foodstuff substantially as hereinbefore described.

10. An item of foodstuff packaged by the method of any one of the preceding claims.



Application No: GB 9722400.0  
Claims searched: 1-10

Examiner: Emma McLean  
Date of search: 31 March 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): B8C (CF11, CF13, CP8)

Int Cl (Ed.6): B65B 25/00, 25/04, 25/16, 25/18, 53/02, 53/04, 53/06

Other: Online: WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 832,076 (Charlesby) - see page1, lines 52-60, page 2, lines 82-87 and 97-100.	1, 2, 3, 4, 5
X	GB 715,366 (ICI) - see page 2, lines 3-23 and 100-122	1, 2
X	US 3,686,823 (Vac Pac) - column 3, lines 34-42, column 4, lines 16-27	1, 2

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

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A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.